

Claims

- 1           1.       A submersible gas compressor comprising:  
2               a ceramic high pressure piston in contact with a ceramic sleeve;  
3               a drive piston mounted to said ceramic high pressure piston such that  
4       movement of said drive piston simultaneously moves said ceramic high  
5       pressure piston; and  
6               a crank in mechanical connection with said drive piston.
- 1           2.       The compressor of claim 1 further comprising a thermal  
2       immersion tank comprising a liquid heat transfer fluid.
- 1           3.       The compressor of claim 1 further comprising a compliant  
2       coupling between said ceramic high pressure piston and said drive piston.
- 1           4.       The compressor of claim 1 wherein said crank has a double  
2       hung shaft operating independent of cantilever motion.
- 1           5.       The compressor of claim 1 wherein said ceramic high pressure  
2       piston contacts said ceramic sleeve independent of a lubricating liquid.
- 1           6.       The compressor of claim 1 wherein the reciprocating movement  
2       of said drive piston cycles between 600 and 800 cycles per minute.

1           7.     The compressor of claim 2 wherein the liquid heat transfer fluid  
2     is an aqueous solution.

1           8.     A gas delivery system comprising:  
2           a first stage compressor pressurizing an inlet gas to between 90 and  
3     500 psig;  
4           a first absorption bed comprising a molecular sieve material in fluid  
5     communication with said first stage compressor, said absorbent bed enriching  
6     an exiting gas stream in at least one inlet gas component;  
7           a second stage compressor immersed in a liquid heat transfer fluid,  
8     compressing the exiting gas stream to a pressurized gas stream having a  
9     pressure of between about 5000 and 10,000 psig;  
10          a cascade system for storing the pressurized gas stream at a pressure  
11     between about 3500 and 5000 psig;  
12          a control system in operational control of at least one of said first stage  
13     compressor, said absorbent bed, said second stage compressor and said cascade  
14     system; and  
15          an outlet for delivering said pressurized gas stream.

1           9.     The gas delivery system of claim 8 wherein said molecular sieve  
2     is type 5A and said at least one inlet gas component is oxygen.

1           10.    The gas delivery system of claim 8 further comprising a  
2    blending valve interspersed between said absorbent bed and said second stage  
3    compressor for delivering in combination the exiting gas stream and the inlet  
4    gas.

1           11.    The gas delivery system of claim 8 further comprising at least  
2    one monitoring device selected from the group consisting of: pressure gage,  
3    oxygen concentration gage, and thermocouple, coupled to said cascade system  
4    and providing data to said control system.

1           12.    The gas delivery system of claim 8 further comprising a  
2    blending valve in fluid communication with said outlet and the inlet gas for  
3    delivering in combination pressurized gas stream and outlet gas.

1           13.    The gas delivery system of claim 8 further comprising a second  
2    absorption bed.

1           14.    The gas delivery system of claim 13 wherein the first absorption  
2    bed is connected in series with the second adsorption bed.

1           15.    The gas delivery system of claim 13 wherein the first absorption  
2    bed is connected in parallel with the second adsorption bed.